DOCUMENT RESUME

ED 226 275 CG 016 468

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TITLE Undergraduate Psychology Laboratories: Building Them, Funding Them. A Symposium.
PUB DATE Aug 82
NOTE 54p.; Paper presented at the Annual Convention of the American Psychological Association (90th, Washington, DC, August 23-27, 1982).
PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Building Plans; *Classroom Design; College Buildings; Construction Needs; Counselor Training; *Educational Facilities Design; *Educational Finance; Higher Education; Information Sources; *Laboratories; Laboratory Equipment; Program Descriptions; *Psychology

ABSTRACT

This symposium consists of four papers presented as part of the program of the American Psychological Association's Division on the Teaching of Psychology. The initial paper, by Ludy Benjamin, describes the results of a survey, conducted in 1980, of 504 psychology laboratories. It includes information on departments that have undertaken laboratory construction and/or renovation in the past 10 years. Data are provided on the amount of money spent and the nature of the laboratories constructed. An appendix lists those departments willing to share their expertise with other departments considering similar construction. The second paper, by Clifford L. Fawl, describes the planning of the undergraduate laboratory at Nebraska Wesleyan University, a complex of 25 laboratory rooms for teaching and research. In the third paper, Henry E. Klugh describes the planning and use of the 15,000 square foot psychology laboratory at Alma College. Both case histories provide suggestions about the planning and design of undergraduate laboratories. The final paper, by Charles M. Stoup, relates the results of a 1982 survey of 107 departments queried about their sources of funding, ways in which the money was spent, relative usage of the laboratories for teaching and research, and the nature of outside sources used to assist in the planning of the labs. A brief appendix lists private foundations which were reported as sources of funding. (Author/JAC)

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UNDERGRADUATE PSYCHOLOGY LABORATORIES: BUILDING THEM, FUNDING THEM

A SYMPOSIUM*

Ludy T. Benjamin, Jr., Chair

1. Psychology Laboratories: A Survey of 500 Colleges and Universities (Ludy T. Benjamin, Jr.)

2. The Nebraska Wesleyan University Psychology Laboratory (Clifford L. Fawl)

3. Planning the Undergraduate Psychology Laboratory: Alma College as Case History (Henry E. Klugh)

4. Funding Sources for Construction and Renovation of Psychology Laboratories (Charles M. Stoup)

* Presented at the 1982 meeting of the American Psychological Association, Washington, D.C.

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PSYCHOLOGY LABORATORIES: A SURVEY OF 500 COLLEGES AND UNIVERSITIES[1]

Ludy T. Benjamin, Jr.

Texas A&M University

A little more than ten years ago I was part of a small psychology department in a 4-year liberal arts college facing the exciting prospect of a new building that would house an extensive psychology laboratory. There were four of us in the department and no one had any experience in the design of such laboratories. But we had lots of time to plan and over the course of more than a year we talked about what we wanted and how to plan it. We talked with colleagues at other institutions, received copies of floor plans from several other colleges, and read articles in the psychological literature that were descriptive of laboratories. Later in this symposium Dr. Fawl will describe the results of that effort.

A few years later I left that college to head the Educational Affairs Office of the American Psychological Association. I had been in Washington for a short time when I began to get inquiries, by phone and mail, regarding what information APA had to offer about the construction of psychology laboratories. Mostly these requests came from small colleges, for example, I remember letters from Reed College in Oregon, Washington and Jefferson College in Pennsylvania, and Mount Union College in Ohio. All three made a reasonable request of my office, yet I had little information to offer them. Having been in that situation myself as I described

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[1]Paper presented at the 1982 meeting of the American Psychological Association, Washington, D.C.

earlier, I decided to take some action to create a resource network to aid departments planning laboratory construction. Obviously there were many colleges and universities with new laboratories. All I had to do was to find where they were located and then match them with those departments planning a similar facility.

I placed an announcement in the November 1978 issue of the APA Monitor which I entitled "New Facilities?". The announcement was bordered in black and prominently placed on one of the non-advertising pages. It read as follows:

> APA is accumulating information concerning the construction and renovation of psychology laboratories and training facilities. Of particular interest is information on institutions which have constructed or remodeled new facilities within the past ten years; specifically the type of laboratory (e.g., physiological, counseling, developmental, social, etc.), its size and physical layout and a description of special features incorporated in the planning of the lab. Also needed are volunteers to serve as a resource to another institution planning the construction of similar laboratories. Materials should be sent to Ludy Benjamin, Jr., Educational Affairs Office, APA, 1200 Seventeenth Street, N.W., Washington, D.C. 20036.

I then prepared for the deluge of mail from departments bursting with pride over the excellence of their laboratories. Two months after the article appeared I had received a total of 13 letters. All had seen the announcement and all wanted to see the information I had collected. Not one department responded to my request. Needless to say, it was most embarrassing to have to write to those 13 institutions informing them that I had nothing to offer other than some information from my own experience at Nebraska Wesleyan University. In future months I would receive additional requests and by then I had prepared a standard reply that contained what suggestions I had plus a two-page bibliography of potential sources of information.

In reflecting on my failure, I reasoned that the lack of response from departments was likely due to two factors: (1) departments simply had not seen the announcement in the Monitor and/or (2) I had asked for preparation of information that people felt would be too time consuming. So approximately a year later I was ready to try again with a procedure which I hoped would produce better results. In January of 1980, I mailed a 1-page questionnaire to approximately 1,700 psychology departments. Roughly 1,200 of those were located in four-year colleges, while the other 500 were in institutions offering graduate education in psychology. The questionnaire asked about the nature of recent laboratory construction and renovation and whether or not these institutions would be willing to share their expertise with other

institutions planning similar facilities. We received a total of 507 questionnaires for a return rate of approximately 30%. Missing data reduced the usable number to 497. Of that number, 342, or 69% of the respondents indicated that they had engaged in laboratory construction or renovation in the previous ten years.

Table 1 presents a summary of these data listed separately for programs offering a baccalaureate, master's, or doctoral degree. While laboratory construction has occurred at all levels, it is clear that such activity has been more common in graduate institutions, particularly those that offer a doctoral degree in psychology. This trend is consistent in terms of the nature of the construction, that is, renovation or new construction, and in terms of the amount of money spent.

It is obvious from the data summarized in Table 1 that renovation has been a more frequent means of laboratory improvement than new construction, and that new construction has been more prevalent in doctoral departments when compared to those offering a baccalaureate or master's degree. Further, when compared to baccalaureate departments, doctoral departments are more than twice as likely to have spent in excess of $25,000 on laboratory improvement in the past decade.

The one statistic that is similar across all levels of degrees offered is the percentage of institutions willing to assist others in the planning of laboratories, a figure around 88%. Appendix A

lists these 301 departments by state. In addition, each listing indicates the type of laboratory constructed in the past decade, for example, operant conditioning, biofeedback, statistics, perception, and so forth. If you are contemplating laboratory construction you should probably get in touch with departments with relevant facilities in your state or region and make plans to visit those facilities in the early stages of your planning.

Later in the symposium you will hear from two individuals who have designed large undergraduate psychology laboratories, whose presentations will provide you with case histories documenting the planning and subsequent use of those facilities. You will also hear a presentation that answers the question -- where did these colleges and universities acquire the funds necessary for their laboratory construction?

In the time remaining to me I want to make a few other suggestions which I think may be useful to you. These remarks concern the availability of published material that you might wish to consult.

In the early days of American psychology, it was common for psychology departments to publish elaborate descriptions of their laboratories. For example, James Mark Baldwin described the laboratory at the University of Toronto in an 1892 issue of Science, Hugo Münsterberg described the Harvard University laboratory in 1893, and E. B. Titchener wrote about his Cornell University laboratory in 1898. Such articles have appeared in the psychological

literature since that time, however, those kinds of articles have been largely nonexistent since the 1960s.

You might assume that a laboratory constructed in the 1950s or 1960s would have little value in your current plans, but that is probably not the case. It is likely that you may gather several excellent design ideas from these articles, thus I encourage you to invest a little time in reading some of them. Appendix B lists a number of these laboratory descriptions dating back to 1920.

Finally, Appendix C lists some other useful references from such journals as Behavior Research Methods and Instrumentation and the special instrumentation issues of the American Psychologist published in 1969 and 1975.

Hopefully the ideas you can get from these sources as well as those from our other panelists today will aid in your planning of your laboratory. Best wishes to you in that endeavor.[2]

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[2]The author is grateful to Jim Lane, Kathleen Lowman, Cindy Miller, and Joy Stapp for their assistance in this project and to the 507 psychology departments that took the time to reply to the questionnaire.

Table 1

Summary of Laboratory Construction Survey

	BA/BS (268)[a]	MA/MS (109)	Ph.D. (120)	TOTALS (497)
Depts. that have constructed laboratories in past 10 years	64% (171)	71% (77)	78% (94)	69% (342)
Construction was renovation[b]	51% (87)	53% (41)	57% (54)	53% (182)
Construction of new facility[b]	27% (46)	31% (24)	45% (42)	33% (112)
Willingness to share expertise with other institutions	89% (152)	87% (67)	87% (82)	88% (301)
Amount of money spent:				
Less than $25,000	48% (83)	29% (24)	18% (17)	36% (124)
More than $25,000	31% (54)	53% (41)	67% (63)	46% (158)
Figure not available	20% (34)	16% (12)	15% (14)	18% (60)

[a]Numbers in parentheses represent the number of reporting departments.

[b]Some departments are included in both of these categories.

APPENDIX A

RESOURCE INSTITUTIONS AND THEIR PSYCHOLOGY LABORATORIES CONSTRUCTED IN THE 1970S

LEGEND (* included in "all areas")

AL	animal learning*	HL	human learning
AS	animal surgery	L	learning*
B	biofeedback	M	motivation
CL	clinical*	PE	perception*
CO	counseling*	PH	physiological*
D	developmental*	S	social*
E	experimental	SE	sensory
G	general purpose	ST	statistics

ALABAMA

University of Northern Alabama: PE, SE
Alabama A&M University: all areas except PE and S
Auburn University: all areas except D and S
University of Alabama: all areas except D

ALASKA

University of Alaska-Anchorage: AL, L, PH

ARIZONA

Arizona State University: all areas except D

ARKANSAS

Harding University: AL, PH, L, psychometrics
Ouachita Baptist University: AL, L, PE
University of Arkansas-Little Rock: all areas except CO, CL, S; also has a human factors lab

Southern Arkansas University: AL, CO, CL, S, psychological testing
Hendrix College: AL, PH, AS

CALIFORNIA

University of the Pacific: all areas, B, instructional technology
Calif. State Univ. - Sacramento: AS, L, PH, CO, CL, sleep
San Diego State University: all areas
Occidental College: PE, AL, L, PH
Univ. California-Los Angeles: all areas
United States International University: PH, CO, CL
Point Loma College: AL, CO, CL
California Baptist College: CO, CL
San Francisco State University: B, all areas except L, S, PE
Calif. State Univ.-Los Angeles: all areas, reptile & aquatics labs
Marywood College: L, PH, PE
Whittier College: AL, L, PH, AS
Pacific Union College: L, PH, B, CO, CL, S
Calif. State Univ.-Long Beach: all areas
Calif. State Univ.-Northridge: all areas except D

COLORADO

University of Denver: computer lab
Colorado College: all areas except D, S, CO, CL
Adams State College: CO, CL, PE

CONNECTICUT

Fairfield University: all areas
Wesleyan University: AL, PH, AS
University of Connecticut: all areas
Trinity College: all areas except D, S, CO, CL
University of New Haven: AL, L, PE, S

DELAWARE

University of Delaware: all areas, psycho-acoustic lab

DISTRICT OF COLUMBIA

Howard University: PH, AS, S
Georgetown University: all areas except CO, CL

FLORIDA

Florida A&M University: AL, CO, CL
Palm Beach Atlantic College: AL, PH, L, B
University of Northern Florida: AL, PH, AS, CO, CL, cognition
University of South Florida: ST, research methods
Stetson University: AL, L, PH, PE, S

University of Central Florida: AL, ST, B
Florida Southern College: AL, L, PH, D
Florida International University: G, E
University of West Florida: all areas, B
University of Florida: all areas except CO, & CL; includes cognition

GEORGIA

Georgia State University: all areas
Georgia Institute of Technology: AL, D, L, PE
Morehouse College: CO, CL, AL

HAWAII

University of Hawaii-Hilo: all areas except CO, CL, PE

IDAHO

Northwest Nazarene College: AL, AS

ILLINOIS

Illinois Benedictine College: all areas except D
St. Xavier College: L, CO, CL, PE, S
Southern Illinois University: all areas except AS, D
Lewis University: AL, AS, PH, PE
Illinois Wesleyan University: AL, L, PH, CO, CL
Illinois Institute of Technology: SE, sleep, psychophysiology
Eureka College: AL, L
Monmouth College: all areas except D, CO, CL
Illinois State University: all areas except D, includes a shop
Judson College: L, PH, PE
Northern Illinois University: all areas
Greenville College: AL, B, information processing
Eastern Illinois University: all areas except D, S
Olivet Nazarene College: AL, L, PH, PE, S

INDIANA

Indiana Univ.-Purdue Univ. - Fort Wayne: AS, PH, E
St. Mary's College: AL, L, PH, B, fish lab
University of Notre Dame: all areas except PH
Indiana State University: AL, PH, PE, CO, CL
University of Evansville: all areas

IOWA

Iowa State University: all areas except D, L
Coe College: AL, L, PE
Grinnell College: all areas except CO, CL, PE
Northwestern College: AL, D, L, S
Central College: AL, PE, L

Maharishi International University: D, L, PH, PE, S
University of Northern Iowa: all areas except D, CO, CL; includes a behavior genetics lab

KANSAS

Kansas State University: all areas except CO, CL
Emporia State University: all areas except D,S,PE; includes memory & cognition lab

KENTUCKY

Thomas More College: PE, HL, insect colony
Eastern Kentucky University: PH, AS, L, PE, CO, CL
Murray State University: AS, PH, L, PE, CO, CL
University of Kentucky: all areas
Centre College of Kentucky: all areas except D, CO, CL
Northern Kentucky University: all areas except S, AS

LOUISIANA

Tulane University: all areas
Loyola University: AL, L, PH, PE, B
Xavier University: AL, L, PE, memory
New Orleans Baptist Theological Seminary: CO, CL, marriage & family
Centenary College: AL, L, PH, PE
Southeastern Louisiana University: AL, PH, S
University of New Orleans: all areas except S

MAINE

University of Maine: all areas
Bates College: AS, D,PH,PE, ST, psychophysics
Colby College: all areas except S, CL, CO
Bowdoin College: AL, D, PH

MARYLAND

St. Mary's College: AL, L, D
Johns Hopkins University: all areas except CO, CL

MASSACHUSETTS

Mt. Holyoke College: E, PH, AS
Springfield College: L, PH, PE, CO, CL, B
Western New England College: AS, L, PH
University of Massachusetts: all areas, including personality & cognition
Tufts University: AL, D, PE, S
Northeastern University: AL, L, PH, PE, S
Gordon College: D, S, CO, CL
Wellesley University: all areas except AS

North Adams State College: AL, S, L
Suffolk University: AL, G
Boston College: AL, PH, PE, S
Framingham State College: AL, G, E
College of the Holy Cross: all areas except PE
University of Lowell: AL, E

MICHIGAN

William Carey College: AL
Hope College: all areas except CO, CL
Aquinas College: AL, L
Calvin College: AL, L, AS, PH
University of Detroit: PH, CO, CL, PE, S
Alma College: all areas except D, CO, CL, S
Western Michigan University: AL, L, PH, D
Northern Michigan University: all areas except CO, CL, S
University of Michigan: all areas except CO, CL: includes math psychology lab
Hillsdale College: AL, L, CO, CL

MINNESOTA

St. Olaf College: AL, AS, PH, human performance
University of Minnesota-Morris: all areas
College of St. Catherine: S, L, D, memory
Macalester College: AL, PH
Carleton College: all areas except D, CO, CL

MISSISSIPPI

University of Southern Mississippi: AL, L, CL, CO
Delta State University: AL, L, PH, cognition & memory

MISSOURI

School of the Ozarks: L, CO, CL
Northeast Missouri State University: AL, PH, B
Drury College: AL, L
Washington University: all areas except CO
Bowie State College: AL
Northwest Missouri State University: all areas except D, CO, CL
Missouri Southern State College: all areas except D, CO, CL, AS
University of Missouri: AL, L, PE, S
Southwest Missouri State University: AL, L, PH
Lindenwood College: L, PE, S

MONTANA

University of Montana: all areas

NEBRASKA

Kearney State College: AL, L, PH, AS
Creighton University: AL, L, PH, AS
Bellevue College: AL
Hastings College: AL, L, PH

NEW HAMPSHIRE

University of New Hampshire: all areas except CO, CL

NEW JERSEY

William Patterson College: all areas except CO, CL, S
Ramapo College: AL, PH, S
Drew University: AL, L, PH
Upsala College: all areas except AS
Monmouth College: AL, L, PH, PE, B
Princeton University: all areas except CO, CL

NEW MEXICO

New Mexico State University: L, PE, E
University of New Mexico: all areas
Western New Mexico University: L, PH, PE
College of Santa Fe: AL, PH
New Mexico Highlands University: AL, HL, S

NEW YORK

Ithaca College: L, PE, PH, AS, cognition
State Univ. College at Buffalo: all areas
SUNY-Oneonta: all areas
SUNY-Cortland: L, SE, PH, M
Colgate University: all areas
D'Youville College: AL, HL, PE
Queens College of CUNY: all areas
St. Lawrence University: AL, D, PH, PE, S
Houghton College: AL, PH, B
LeMoyne College: L, PE, S
Union College: all areas except CO, CL
St. John's University: AL, PE
Roberts Wesleyan College: AL
Brooklyn College: AL, PH, PE, S
SUNY-Fredonia: AL, AS, PH
SUNY- Stony Brook: all areas
SUNY-Geneseo: all areas except D, S
St. Bonaventure University: AL, L, S

SUNY-New Paltz: AL, AS, CO, CL
Malloy College: HL, PE, B
Mercy College: AL
SUNY-Plattsburgh: AL, L, PH
Barnard College: all areas except CL, CO
SUNY-Purchase: all areas except CL, CO

NORTH CAROLINA

Univ. North Carolina-Greensboro: all areas
Meredith College: AL, L, PH, PE
North Carolina State University: personnel lab and all areas except CL
University of North Carolina-Chapel Hill: AL, AS, behavioral pharmacology & toxicology
East Carolina University: AL, PH, AS
Univ. of North Carolina-Wilmington: AL, HL
Pembroke State University: G

NORTH DAKOTA

University of North Dakota: all areas except PH, AS

OHIO

College of Wooster: AL, L
Case Western Reserve University: PE, D, L, PH
Kent State University: AL, L, PH, AS
University of Toledo: AL, D, L, PE, S
University of Dayton: CO, CL, S, PE
Cleveland State University: B, and all areas except D, CO, CL
Kenyon College: AL, L, PH, AS, memory
Mount Union College: AL, L, PE
Ohio State University: all areas
Miami University: all areas except CL, CO
Youngstown State University: all areas
Ohio Northern University: D, L, S, CL, CO
Oberlin College: CO, CL, S
Hiram College: fish lab, and all areas except CO, CL

OREGON

University of Portland: L, CO, CL, PE
Lewis & Clark College: AL, L, PH, PE
University of Oregon: AL, AS
Reed College: all areas except CL, CO
Linfield College: HL, PE, S

PENNSYLVANIA

Bloomsburg State College: AL, PH, SO, ST
Shippensburg State College: AL, L, PH, PE

Allentown College: AL, L
Chatham College: AL, L, PH, PE, M, S
Kutztown State College: AL, D, S, B, PH
Lafayette College: all areas except D, S
Lehigh University: AL
Franklin & Marshall College: all areas except CL, CO
Edinboro State College: AL, L
Bucknell University: AL, L, PH, PE
Geneva College: AL
Gettysburg College: AL, PH
University of Pittsburgh-Johnstown: AL, L, PH, PE, B
St. Francis College: AL, PH
Seton Hill College: B, all areas except S
Washington & Jefferson College: all areas except D, S
Chestnut Hill College: AL, L, CO, CL
West Chester State College: AL, HL, B, AS
Haverford College: AL, L, PE, memory & cognition
Beaver College: AL, L, PE, S
Millersville State College: AL, PE, CO, CL

RHODE ISLAND

Providence College: AS, D, PH, S
University of Rhode Island: AL, L, PH, PE, AS

SOUTH CAROLINA

Limestone College: S, CO, CL
University of South Carolina: all areas
Clemson University: AL, L, PH, PE

SOUTH DAKOTA

Dakota State College: L, S, ST

TENNESSEE

Christian Brothers College: G, E
Vanderbilt University: all areas except CL, CO
Tennessee Technological University: all areas except D,S
Tennessee Temple University: AL, E
Memphis State University: all areas
East Tennessee State University: AL, AS, PH
Middle Tennessee State University: AL, L, PH
University of the South: AL, L, PH, AS
King College: all areas except PH, CO, CL
Tennessee State University: AL, L, PH, B
University of Tennessee-Knoxville: AL, psychophysiology
Maryville College: AL, PE, PH

TEXAS

Southern Methodist University: all areas
University of Texas-Austin: psycholinguistics, cognition, and all areas except CO, CL
Our Lady of the Lake University: AL, L, PH
University of Texas-Arlington: AL, L, PE, PH, AS
Pan American University: AL, PE, L, B
Austin College: all areas except S, CL, CO
Texas Christian University: all areas except D, CO, CL
Texas Lutheran College: L, E, G
University of Texas-Permian Basin: AL, CL, CO
Sam Houston State University: all areas except D, PE
Southwestern University: HL
Texas Tech University: computer lab, and all areas
University of Texas-El Paso: all areas except D, P
Howard Payne University: AL
University of Texas-San Antonio: memory & cognition, all areas except PH
West Texas State University: HL, memory, and all areas except S
Abilene Christian University: B, CO, CL
Rice University: D, L, PE, S

UTAH

Utah State University: AL
Westminster College: AS, PH, PE, human factors
University of Utah: all areas except PE

VIRGINIA

Lynchburg College: E, HL, AL
George Mason University: all areas
University of Virginia: neurochemistry, all areas
Hollins College: AL, L, PH
James Madison University: AL, L, CO, CL, cognition
University of Richmond: AL, D, L, E
Virginia Commonwealth University: AL
Mary Baldwin College: AL, PH
Emory & Henry College: AL, PH, PE
Hampton Institute: AL, L, PH, PE
Washington & Lee University: all areas except S, CL, CO

WASHINGTON

Walla Walla College: AL, B, CO, CL
Central Washington University: all areas except D,S
Western Washington University: AL, PH, PE, CO, CL
Whitman College: AL, L, PH, PE, B, S

WEST VIRGINIA

West Virginia University: AL, D, PH, AS, S
West Virginia Wesleyan University: AL, L, PH
Concord College: AL, PH, AS

WISCONSIN

University of Wisconsin-Oshkosh: AL, PH, CO, CL, PE
University of Wisconsin-Madison: all areas except CO
University of Wisconsin-LaCrosse: all areas except D, PH
Marquette University: all areas except L, PE
Lawrence University: AL, L, PH, PE

WYOMING

University of Wyoming: PH
Siena College: AL, G, E

CANADA

St. Thomas University: G
Mount Allison University: AL, D, L, CO, CL, PE
Carleton University: SE, AL
Concordia University: all areas
University of Western Ontario: all areas
University of Manitoba: all areas
University of Victoria: AL, PH, AS, PE
McGill University: AL, L, AS, PE
University of Saskatchewan: all areas except D, PE
Simon Fraser University: AL, D, PH, AS
University of Alberta: computer lab and all areas
Laurentian University: AL, L, PH, S, audiology
Brandon University: AL, L, PH, PE, S

PUERTO RICO

International American University: AL, L
Interamerican University: L, CO, CL

APPENDIX B

DESCRIPTIONS OF AMERICAN PSYCHOLOGY LABORATORIES AND TRAINING FACILITIES

(Anon.) Primate research at the Institute of Living Psychophysiological Laboratory. Digest of Neurology and Psychiatry, 1953, 21, 167-171.

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Davenport, J.W. The multipurpose psychological laboratory at Amherst College. American Journal of Psychology, 1963, 76, 694-697.

Dufort, R.H. The psychological laboratories of Wake Forest College. American Journal of Psychology, 1962, 75, 661-664.

Fay, P.J. & Middleton, W.C. The DePauw laboratory for research on the psychological problems of radio. American Journal of Psychology, 1941, 54, 571-575.

Foster, D., Scofield, E.H. & Dallenbach, K.M. An olfactorium. American Journal of Psychology, 1950, 63, 431-440.

Freeman, G.L. The research laboratory in psychophysiology at Northwestern University. American Journal of Psychology, 1938, 51, 176.

Grinsted, A.D. The new psychological unit of Louisiana State University. American Journal of Psychology, 1942, 55, 112-113.

Halverson, H.M. The Yale psycho-clinic photographic observatory. American Journal of Psychology, 1928, 40, 126-128.

Howe, H.E. The Florida anthropoid laboratory of Yale University. Science, 1929, 70, 444-445.

Kellogg, W.N. The Indiana conditioning laboratory. American Journal of Psychology, 1938, 51, 174-176.

Kenyon, G.Y. The psychological laboratories at the University of Wichita. American Journal of Psychology, 1958, 71, 600-601.

Kline, L.W. The Skidmore College laboratory of psychology. American Journal of Psychology, 1931, 43, 300-302.

Langfeld, H.S. Princeton psychological laboratory. Journal of Experimental Psychology, 1926, 9, 259-270.

Murray, E. The Cornell optical laboratory. American Journal of Psychology, 1938, 51, 734-737.

Peak, H. The Parrish laboratories of psychology at Randolph-Macon Woman's College. Journal of Experimental Psychology, 1939, 24, 551-553.

Portenier, L.G. The psychological laboratory at the University of Wyoming. Psychological Exchange, 1934, 3, 63-64.

Reymert, M.L. The new psychological laboratory of Wittenberg College. American Journal of Psychology, 1928, 40, 171.

Reymert, M.L. The Mooseheart Laboratory for Child Research. American Journal of Psychology, 1931, 43, 302-303.

Riopelle, A.J. Facilities of the Emory University Primate Behavior Laboratory. Journal of Psychology, 1954, 38, 331-338.

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APPENDIX C

SELECTED RESOURCES ON LABORATORY CONSTRUCTION AND INSTRUMENTATION

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Special Instrumentation Issue of the American Psychologist, 1969(Mar.), 24, 185-408. Contains material on labs in psychophysiology, sleep, visual perception, behavior therapy, biofeedback, operant research, biopsychology, social psychology, psychological testing, plus an article on observation room windows.

Special Instrumentation Issue of the American Psychologist, 1975(Mar.), 30, 191-468. Contains sections on computer technology, biopsychology, sensory information systems, clinical and applied research techniques.

The Nebraska Wesleyan Psychology Laboratory[1]

Clifford L. Fawl
Nebraska Wesleyan University

The purpose of this paper is to describe the psychology laboratory at Nebraska Wesleyan University, its design and development, in the hope that other undergraduate colleges might profit from our experience. Our own laboratory was built in 1974 and opened for use in January of 1975. Fortunately for us, we had the advantage of designing a laboratory for a new building rather than remodeling already existing space. The laboratory contains 26 rooms, mostly small cubicles, and covers approximately 3,800 square feet.

Ours is a 5-person department (4 persons at the time the lab was built) in a liberal arts college of 1100 students. We graduate approximately 20 psychology majors a year, a figure which includes two interdepartmental majors with a strong emphasis in psychology. Our emphasis upon research experience as a requisite part of undergraduate study commenced well in advance of the construction of the laboratory I am to describe here. Since 1961 all psychology majors have been required to conduct an independent empirical investigation (usually an experiment) during their Senior year. I note this because it may well have been influential with the college administration in supporting our proposal for a new laboratory: in effect, they were in the position of enhancing a research-oriented curriculum already in existence rather than having to take a promissory note that such a program would be implemented if a new lab were provided.

We now offer 23 standard courses in psychology (in addition to Special Projects, Directed Readings, et cetera), six of which have a laboratory as an integral part of the course. These include Perception, Learning and Motivation, Experimental Psychology, Sleep and Dreaming, Animal Behavior, and Physiological

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[1]Delivered at the American Psychological Association Convention, Washington, D.C., August 26, 1982, Symposium on "Undergraduate Laboratories in Psychology."

Psychology. Many other courses in the department (e.g., Social Psychology) make occasional use of the laboratory facilities. In addition to class use, the facilities are utilized for independent student research (the Senior projects to which I referred earlier) and faculty research. Of the three major types of laboratory use, faculty research is the least, so ours is a laboratory primarily for student use.

Slide 1 shows the overall floor plan of the lab. Several major segments may be identified: the General Purpose cubicles, the Independent Research cubicles, the Perception Laboratory, the Animal Surgery and Histology Lab, the Sleep Lab, the Social Psychology Lab, the Operant Conditioning Lab, the Pigeon Vivarium, and the miscellaneous support rooms -- the animal colony, the audio-visual room, the workshop, and the main classroom (which also doubles as a laboratory room for several of the classes).

Let us start our tour with the General Purpose area. This is a set of six cubicles that come off the main classroom. They are used primarily as lab rooms in conjunction with the Learning and Motivation course, at which time a Skinner Box is included in each room and the Experimental Psychology course. A removable wooden panel, 3' x 3', is placed in each wall separating adjacent cubicles. Also, a small blank conduit box is in the wall separating adjacent rooms, thus permitting easy wiring from one cubicle to the next.

The four Independent Research cubicles are adjacent to the Social Psych Lab and were originally designed to be a part of that lab, but in practice these four cubicles have been used for a wide variety of Senior research projects which use one human subject at a time. As with the General Purpose cubicles, these rooms are very small (inside dimensions of 7' x 7'), but they do provide

the privacy often necessitated by psychological research. Again, as with the General Purpose cubicles, blank conduit boxes are in the walls separating adjacent rooms, but unlike the General Purpose rooms, the Independent Research cubicles have one-way mirrors instead of wooden panels in the walls between cubicles, and also in the wall between the cubicle and the control room of the Social Psych Lab. These mirrors are the same size as the removable panels and are so designed that the mirrors and wooden panels can be interchanged.

At the outset we had planned for four additional Independent Research cubicles. The fact that we were able to easily convert them to other, more specific, functions illustrates the flexibility we included in our laboratory design. For example, two rooms were converted into a small Operant Conditioning Lab, with a programmable equipment rack in one cubicle and two subject boxes (one for pigeons and one for rats) in the adjacent room. Since we had a blank conduit box available, wiring from one room to the other was no problem. Two other rooms were made into a small Animal Behavior Lab. We added a liner to the interior of one room so that it could serve as a pigeon vivarium for five or six birds. The adjacent room could be used as an observation room for the vivarium by replacing the wooden panel between the rooms with a one-way vision mirror.

Even more recently the observation room has come to double as a housing for fish tanks. Students maintain records of fish behavior in the Animal Behavior course.

The Perception Lab was designed as our longest room in the interest of depth perception studies. Its size (12' x 30') has served to advantage for a variety of other purposes as well, some of which having nothing to do with perception and not originally considered for this room. For example, it has served as a classroom for small groups, and it has functioned as a research

space for miscellaneous student studies that require a larger area than allowed for in the small cubicles. Another useful feature has been the kitchen-type storage cabinets that provide both storage and a counter top work space, as shown in the next slide. This room is also designed as a dark room, a feature which is made possible by a light seal that automatically drops down from the bottom of the door when the door is closed. The room is serviced by incandescent lights on dimmer switches, which provide light control; unfortunately, however, the lights are recessed in the ceiling, which results in uneven lumination for the room.

Our Animal Surgery and Histology room is one of the most active areas of our laboratory. It is used during the first semester primarily by Senior Biopsychology majors who are conducting their independent research. (COMMENT) In the second semester, students in the Physiological Psychology class get training in stereotaxic surgery and histology here. The room is equipped with a small surgery table, a gas hood, and a sink. It is serviced by non-arcing electrical outlets for safety purposes. This lab also has the kitchen-type storage and work space noted in the Perception Lab. Given the great amount of usage that this room receives it would have been nicer were it larger than its interior dimensions of 10' x 12', but it nevertheless has served us well.

A sleep lab is quite unusual for an undergraduate college, yet we have one and I am pleased to say that it has been put to good use. Every year one or more Senior research project utilizes this facility. Recently one of these Senior studies, conducted by Mary Spiers, won first prize nationally in the 1981 Psi Chi student research competition. In addition, faculty research and even clinical diagnostic examinations for sleep disorders have been studied here. Recently a course on the Psychology of Sleep and Dreaming was added to the

curriculum, and, as might be expected, this lab is used for that course.

The two sleep chambers shown in the floor plan of Slide 1 were initially part of the General Purpose area rather than the Sleep Lab. The incorporation of these two cubicles was made possible not only by their proximity to the Sleep Lab, but also because we had allowed for removable panels in the walls separating these rooms from the Sleep Lab, which meant that we could replace these panels with the windows and wiring that you see pictured in the slide. Incidentally, the control room is electrically shielded, which is probably an unnecessary expense now in that most laboratory equipment for sleep has adequate filters.

The Social Psychology Lab is a complex of rooms: a control room, two rooms for small groups, and four cubicles for individual subjects (previously identified as Independent Research cubicles). From the control room it is possible to sound record from, and to verbally communicate with, each of the six subject rooms. Between each pair of adjacent rooms is a one-way vision mirror.

The two group rooms get multiple-purpose usage because of their size. Currently, one of these rooms is housing a water immersion tank that is being used for student and faculty research on sensory deprivation. (COMMENT re: lack of social studies and re: the deprivation studies)

Since there already was one animal colony on campus (in the Biology Department) at the time our building was under consideration, the college administration understandably was reluctant to provide for a second colony, yet one was essential for our program. Fortunately, an accommodation was reached and we did obtain space, though less than desirable. The Animal Colony contains housing racks for both pigeons and rats. It also has a sink. The lighting is on a timer which provides for a light and dark cycle.

A small shop room (not shown on the floor plan or in a slide) is across the hall from the laboratory and next to the freight elevator. It is equipped with a work bench, a sink, and storage cabinets. It is serviced with hand tools and provides for only minor equipment construction and repair, yet is a very useful area. Such a room is highly recommended in the design of a psychology laboratory, even where other facilities of superior capabilities are available elsewhere on campus, as is the case at our own college.

Our audio-visual storage area is centrally located, and has direct access to the classroom. With the addition of a videotape recorder and monitor, floor space has become crowded; the room ideally would be twice as large as its present dimensions. Again, a kitchen-type storage and work surface have worked well here, as well as the floor-to-ceiling cabinets used to store lab equipment.

Finally, we include our main classroom in our description of the Psychology Laboratory because it is used as a lab for some classes. That is the reason for the tables you see in the slide rather than writing chairs, unlike the other classrooms in the building. These tables can be used as lab tables for Experimental Psych, Learning and Motivation, and Physiological Psychology. When more secluded space is needed in these lab courses, students can be transferred to the General Purpose research cubicles, which are through the door at the left in the slide. This free flow between the larger room and small cubicles is a very useful feature. The main entrance to the classroom is from the rear of the room, which means that the room has access from both the front and the rear, a feature which we would recommend. One feature which we should have included, but did not, is incandescent lighting.

This, then, completes a quick tour of the Nebraska Wesleyan Psychology

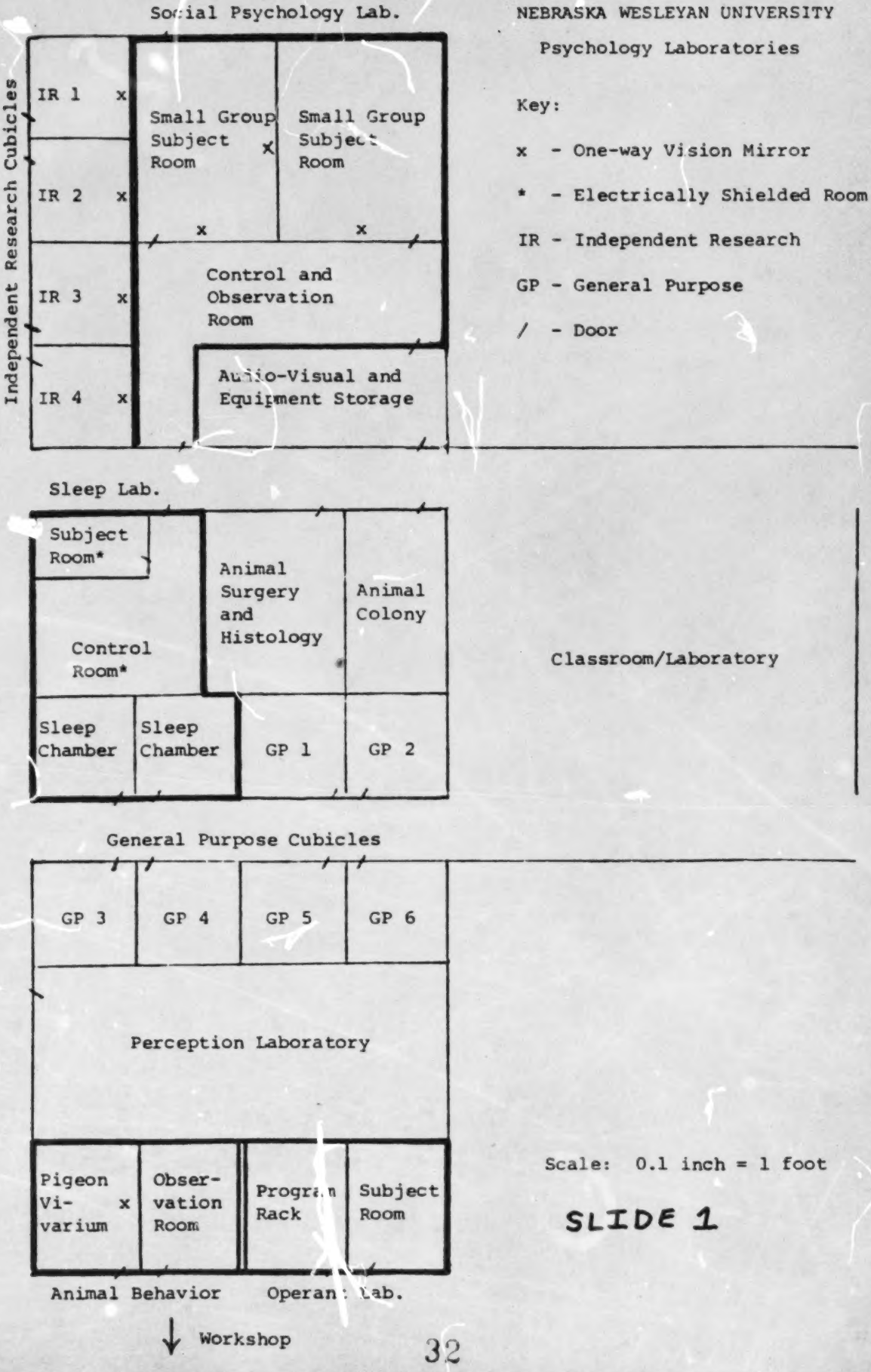
Laboratory. What would we do differently if we were to do it over? Well, for one thing, more storage space would be planned. A lab is like a house: you never seem to allow for enough storage space. Another problem has been noise. The research rooms are carpeted so as to cut down on noise, but noise between adjacent rooms has been troublesome for some studies, especially in the Social Psychology Lab. Filling the walls with sound insulation would have helped. Also, we wish now that we had used incandescent lighting for all of the labs since light control is often a desirable feature. We have it in the Sleep Lab, the control room of the Social Psych Lab, and the Perception Lab, but we could have used it in the other rooms as well, including the classroom.

All in all, I would have to say that we are immensely pleased with how well the lab design has worked out. Further, we are gratified by the heavy usage it has received. Probably the features which we have found most valuable include the flexibility in design of the General Purpose rooms; the large number of rooms (made possible by having mostly very small cubicles); and the arrangement of rooms in such a way as facilitate traffic flow, and, in the case of the Social Psych Lab and the main classroom, access to the room from different sides.

There are two general suggestions which I would pass on to those of you who might be contemplating the building of a psychology laboratory. One is to think in terms of functions of space, not the shape of space. Architects can be most helpful to you if you have a clear notion of how you want to use the space. They, then, can arrange that space more effectively, for that is their realm of expertise. Fortunately we learned this early in the game, and I believe that it contributed substantially to the fact that we seem to have gotten the maximum use of the space which we were allotted. Secondly, I would advise you to start your

planning early, literally years before construction commences (seven years prior to construction in our case). An early start is important because the task is difficult and many revisions will be needed. It is also important for political reasons to get your oar into the water before overall plans for the building have become set. I would guess that the fact that we had specific and detailed plans for what we wanted to do with a laboratory, and that we got them in early because we had done a lot of prior planning, were instrumental to our receiving the generous allocation of space and facilities that we did receive.

Finally, I should like to note that some 15 years ago, when I first started to think about a new psychology lab, I sought in vain for guidance from APA. No guidelines, no illustrations were available. Through APA we were successful in getting to campus two NSF Visiting Scientists (Bill Jaynes from Oklahoma State in 1969 and Greg Kimble, then of Colorado, in 1973), and it was very helpful to obtain their response to the plans we were developing. But nothing from APA itself. I see this symposium as a move in the right direction, and I salute Dr. Benjamin for organizing it. Hopefully, by way of illustration, it will give you some direction in the construction of your own laboratory.


Social Psychology Lab.
NEBRASKA WESLEYAN UNIVERSITY
Psychology Laboratories
Key:
x - One-way Vision Mirror
* - Electrically Shielded Room
IR - Independent Research
GP - General Purpose
/ - Door
Independent Research Cubicles
IR 1 x
IR 2 x
IR 3 x
IR 4 x
Small Group Subject Room
Small Group Subject Room
Control and Observation Room
Audio-Visual and Equipment Storage
Sleep Lab.
Subject Room*
Control Room*
Animal Surgery and Histology
Animal Colony
Sleep Chamber
Sleep Chamber
GP 1
GP 2
Classroom/Laboratory
General Purpose Cubicles
GP 3
GP 4
GP 5
GP 6
Perception Laboratory
Pigeon Vi- varium x
Obser- vation Room
Program Rack
Subject Room
Animal Behavior
Operant Lab.
Workshop
Scale: 0.1 inch = 1 foot
SLIDE 1

Planning the Undergraduate Psychology Laboratory: Alma College as Case History

Henry E. Klugh

Alma College

You have before you the ground floor plan of Alma College's Psychology Laboratory. But before I explain what's what I would like to give you a little background information about the college and the department.

Alma is a traditional liberal arts college located in central Michigan. It has a current enrollment of about 1100 students, all undergraduates. From six to ten psychology majors graduate each year. The department offers a program primarily designed to prepare students for graduate study. The introductory course which meets a portion of the college natural science requirement, has a required laboratory and a formal laboratory is also part of the physiological psychology course. Independent original research is expected in the Sensation-Perception, Motivation-Learning and the Research Methods courses. A major original research program during the senior year is required for graduation with honors in psychology. A rigorous course in statistics is also required and is prerequisite for most advanced laboratory courses. Psychology majors are usually in the upper half of the student body vis a vis entrance examination scores and High School grades. The department is seen

(and probably is) rather elitist.

The history of the psychology laboratory at Alma is an interesting one. I joined the Alma faculty in 1955 as its first and only psychologist. I was assisted by people with training in education, sociology and philosophy in offering a sufficient variety of courses to constitute a major. However, there had never been a laboratory and neither my colleagues nor the administration saw any particular need for one. I did--and as a condition of my coming to Alma I insisted that space for a laboratory be provided. The president kept his word and by October 1, 1955 I had, over the librarian's frantic objections, been awarded a 14' x 16' area in the unfinished basement of the 80 year old college library. It was large enough for one small bank of rat cages and a table on which were four hand made Skinner boxes. The area was set off from the rest of the library by chicken wire which, the librarian was assured, would keep the rats where they belonged in case they got loose.

Now I have this advice: if you are starting a lab take the worst, most miserable, space you are offered. No one will be jealous--and eventually the administration will be so embarrased that they will beg you to move to better quarters. At least that happened to me. Of course I didn't move from the library basement directly to this awesome facility you see before you. I

designed three increasingly elaborate laboratory areas over the years as college enrollment expanded and research grants were obtained. Finally the college acquired a Science Building. Of course psychology was not included in it, but we did get the space vacated by Physics in Old Main basement. This was a substantial improvement over the basement we began in thirteen years earlier. This was a stroke of great good fortune, for in 1969 Old Main burned to the ground and in 1973 a new Academic Center replaced it with, you guessed it, Psychology occupying the entire basement. Viscious rumors to the contrary, psychology department worked as hard as anyone else to put out the Old Main fire, and it was not set by trained rats carrying lighted cigarettes!

Now let me go over this plan with you to show you what we have, what we should have had and what we didn't really need. First and most obvious. We don't need this much space. Of course, 10 years ago, we wanted a facility which would be adequate for Alma's growing enrollment. We got it! We also got some jealous colleagues who were, by then, being squeezed a bit in their slightly older science building.

Beginning in the upper right corner of your map, above corridor E, are five faculty offices, a secretarial bay, and along the right wall, a glass enclosed area for computer terminals. Just below this, at the end of corridor A

is a lounging area and bulletin board. This has worked well, the faculty members are together rather than scattered around the laboratory.

Moving down corridor A from the right, toward the left, you see two blocks of rooms to the south, one on each side of corridor C. These rooms are about 9' x 10' with incandescent lights on dimmer switches and outside occupancy lights which go on when the interior lights are turned on. Each room has a covered conduit passage to permit data to be collected in one room and recorded in any adjacent room. These, labelled "Experiment Room" on your plan, are assigned to students doing individual research. Seventeen rooms are available here for this work. Of course sometimes students can share a cubicle and sometimes an eager beaver will have a two room suite assigned to him or her for the entire year!

If you will now skip all the way down corridor A to the west or left you will see another bunch of "Experiment Rooms" to the south, straddling corridor B. These rooms serve essentially the same purpose as the others, but have the advantage of a one way mirror between each north-south pair of rooms. This is a great help when doing research if you have automated your data collection but you don't entirely trust it and you want to watch S! We also have a major control and recording bank in one of these rooms which plugs into any other

pair of rooms in the block. You can see this conglomeration of BRS logic cards and other stuff These rooms work reasonably well.

It would have been more convenient to have had a door between each pair of rooms. We had thought of doing that but rejected it for fear of noise leaking from one room to another.

Now please look at the area between the two groups of individual experimental rooms. South of corridor A and in the center of the laboratory is the animal room, the "rat room". This room and the surrounding area is tiled, it has floor drains, built in light dark cycle selecter, and a direct air exhaust. There are, of course, adjacent cleaning and food storage rooms as labelled on your plan. There is an automatic cage washer in the clean up room. It is invaluable when it works.

South of the animal room is our physio-lab (labelled animal lab on your map). You can see four students busily doing implants. The physio lab contains refrigeration for drugs, fume hood, sterilizers, freezing microtome etc. It can seat about 12 students comfortably.

Now notice the small room just to the west of the animal lab. It is labelled CONTR. ENVIR. for controlled environment. This is a 7' x 7' room in which we can specify temperature from 20°F to 120°F and relative humidity within reasonable limits. This facility, manufactured by Tenney Engineering, was requested so that we could do stress testing.

We have not really used this room enough to justify the expense nor is it a very reliable device. I believe, however, that it makes possible a very interesting and potentially valuable area of research and I am not prepared to give it back.

Just next to the controlled environment lab is an animal isolation room. This room and the primary animal room I mentioned earlier both have exhaust systems which move air directly to the outside of the building. This feature, plus compulsive changing of drop trays, has meant few if any complaints about odor by our upstair's colleagues.

One feature was added after this plan was drawn. Just to the right of the animal room are two "Experiment Rooms". These are, in fact, electrically

shielded rooms with a one way vision screen between them. They permit very accurate electrical recording by eliminating induction loads. Wally Beagley teaches our physiological psychology course. He routinely brings one of his children to an evening lab session and, after wiring him/her up, puts her/him to bed on one side of the partition. The class and the physiograph are on the other side and the class can observe EEG changes as the child falls asleep. Of course such demonstrations don't always need an electrically shielded room but we know we can get very clean records if we record in it.

That covers just about everything south of corridor A. I move now to the two large rooms labelled "Laboratory" occupying the northwest or upper left quadrant on your plan. These rooms are identical. They are designed to accomodate the laboratory for our introductory course. Students in this course have a two hour weekly required laboratory period devoted in large part to operant conditioning but including also a negative transfer demonstration (mirror drawing), and some psychometric demonstrations. The lower section of each laboratory is really a classroom seating 24. Students are given about 20 to 30 minutes of instruction here and then go to the cubicles at the back of the room to carry out the day's demonstration. These cubicles also have

dimmer switches but glass windows have been added to the doors so that we can tell if someone (or someone's rat) is in trouble without barging into the room.

We've found that three students to one Skinner box is one too many. Two work much better, one experimenter to reinforce, turn lights off and on, and one to record. We don't use any automated equipment at this level because we want the student to watch the rat and not a cummulative recorder; we also want the student to learn first hand about the effect of reinforcement delay without having the possibility eliminated by reliance on a microswitch! The result is that we usually send about eight of the 24 students to four of the cubicles in the other intro. lab. When the lab was planned we expected to have two afternoon lab sessions running simultaneously but enrollments don't make that necessary; both laboratory areas are rarely in use simultaneously unless they are used solely as classrooms.

We now cross corridor D to the room labelled "Testing". This is an observation room. It seats 22 students on swivelled stools around the outside of three interior one way glassed walls. The interior room itself, about 18' x 22', is large enough to observe children at play, committee activity and so on. There

is an intercom system between observer and observed. We have found this room quite valuable and share it with education. They use it routinely for courses in children's literature and storytelling.

Just to the north of this room in the unassigned space is now a dissection laboratory where human cadavers are dissected for laboratory instruction in Biology, Physical Education and Psychology. This facility used under very strict supervision was added in 1980. Prior to this time we shared the tables in our intro. lab with P.E. which taught anatomy by dissecting rhesus monkeys on them. We share our space whenever we can, but it makes for some interesting bed-fellows.

To the right of the observation-testing room is the perception lab. To provide better sound attenuation, we have a double concrete block wall which you can see on the plan; literally, a room within a room. There is a double entry way to preserve the light-tight characteristic of the room. We have lights on dimmer switches and thick carpeting going about three feet up each wall. The remaining walls and ceiling are acoustically tiled. Sensation-Perception lab meets in this room for about the first half of the semester when perceptual phenomena are demonstrated and discussed. The second phase of the lab requires students to conduct an original investigation. For that part of the lab they

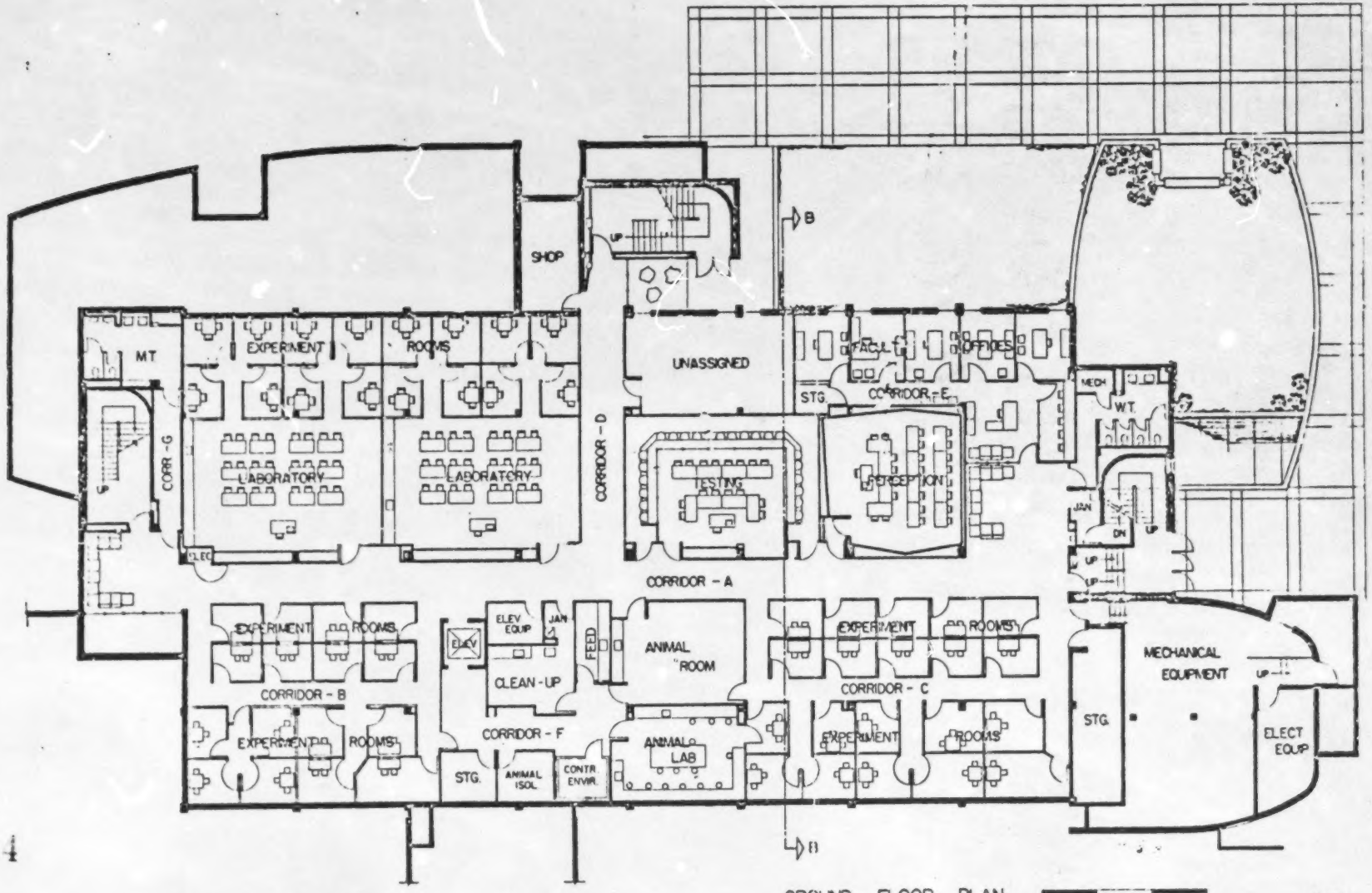
will be assigned one of the experimental rooms we discussed earlier.

This completes the tour. I will now describe some general considerations which you may find helpful. We began the design of the labs in 1970 with a description of our program and the function each room was to serve for the benefit of the architect. And we immediately ran into trouble because we had to be rather vague about what would be done in the 30 or so 9' x 10' experimental rooms. We tried to explain that as these were to be used by students for original research we simply couldn't specify what would be done in each room. Architects just aren't used to that and we could sympathize with the wisdom of "form follows function". Finally we prevailed, but I suggest that you be as specific as possible about what is to be done in the space. You will get much more cooperation and real assistance from your architect. Although we were more concerned about noise than was necessary our architect was very helpful. He used doors which, as they close, extrud a rubber seal from the bottom of the door against the floor. These work very well and help sound attenuation appreciably.

We are of course very happy to have this magnificent facility and we hope to keep a high percentage of our students involved in their own research. However, we do look back, sometimes with real regret, to earlier labs in old converted

private houses or condemned dormitories where we could simply nail something to a wall, or knock the wall out if it suited us. I believe our students felt that way too. Those labs were "theirs", this one is somehow less cordial. Shaw once said that the worst thing in life is not getting what you most want; and the second worst thing is getting it. Shaw may have been right.

ALMA COLLEGE PSYCHOLOGY LABS



GROUND FLOOR PLAN

0 10 20 30

FUNDING SOURCES FOR CONSTRUCTION AND RENOVATION OF PSYCHOLOGY LABORATORIES[1]

Charles M. Stoup

Texas A&M University

In this symposium we have heard descriptions of the design and construction of two excellent psychology laboratories, both of which are located in departments which were fortunate enough to have received major funding for this construction from a private foundation or corporation. However, as noted by Dr. Benjamin earlier, 342 of the responses to the APA Educational Affairs Office survey indicated that they had engaged in laboratory improvements during the past decade. This raises a natural question concerning the sources of the funding for all of this laboratory construction, renovation, and equipment acquisition--are these two departments typical of the departments which have reported laboratory improvements during the past decade, or are these two highly unusual cases. This question is particularly salient today, given the recent shifts in Federal policy concerning the role of the Federal government in (at least certain) aspects of education, and what can only be described as the decimation of the Science Education Directorate of the National Science Foundation.

The initial survey described earlier in this symposium focussed on the types of laboratories that had been improved and on the general nature of that improvement (i.e., was it new construction or renovation, etc.). No attempt was made to ascertain any of the characteristics of the funding of the laboratory improvements beyond an estimate of the total expenditure involved. Therefore, in order to answer these more specific questions concerning the nature of the funding, a second questionnaire was necessary. Let me turn now to the nature and results of this follow-up questionnaire.

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[1]Paper presented at the 1982 meeting of the American Psychological Association, Washington, D.C.

A one-page questionnaire was sent to the 301 department chairpersons who responded in the initial APA questionnaire that they were willing to share information with colleagues concerning their laboratory improvements. The questionnaire asked the department chairs to indicate the amount of money spent for laboratory improvements, the percentage breakdown for construction vs. equipment, the source of the funding, and, for funding sources outside of the college or university, the way in which the department learned about the funding agency. Additionally, the department chairs were asked about outside assistance in the design of the laboratory improvements and/or equipment selection, and the proportion of the time that the laboratory is used for teaching vs. research.

A total of 107 questionnaires were returned, with 97 yielding usable responses for a response rate of 32%. A summarization of the results are provided in Tables 1 and 2. Table 1 shows, by degree program, the average amount spent for lab improvements during the past decade, the percentages of these funds spent for construction as opposed to equipment, and the percentages of the time that the labs are used for teaching and research. There are several trends apparent in these data. First, there was a dramatic increase in the average amount of money spent for lab improvements as a function of the type of degree granted by the department, with doctoral degree granting departments spending considerably more than master's-only and bachelor's degree granting departments. (It is worth noting at this point that the median values provide a much more reliable estimate of the average expenditure, since the distributions of this variable are highly positively skewed.) Secondly, as the degree granted by the department goes from bachelor's to master's-only to doctoral, the

funds expended shift from being spent predominantly on equipment to being more evenly divided between equipment and construction/renovation. Finally, a shift was found for laboratory use, with the labs being used predominantly for teaching purposes in bachelor's departments, while in doctoral departments the labs are used for research purposes a majority of the time.

Turning now to the data concerning the sources of funding, Table 2 presents frequency counts, separated by degree granted, for the sources of the funds used for the laboratory improvements, the sources of information concerning the availability of those funds, and the type of outside assistance employed in the design of the new or renovated facilities or the selection of equipment. As is obvious from this table, a majority of the responding departments indicated that they obtained their funds from within the institution, generally as part of the normal operating budget or as part of a special construction program. In most cases, the category labeled "State Agency" should also be considered institutional funds, since these funds were provided to a state-supported institution. The next largest category of funding sources was the Federal government, with the total of 37 responses in this category being dominated by the 28 responding departments who received funds from the National Science Foundation. Within the total for the NSF responses, 10 departments specified that the funds were obtained through the NSF Instructional Scientific Equipment Program (ISEP), 3 through the NSF College Science Improvement Program (COSIP), 1 was an NSF Scientific Development Grant, and the remaining 14 responses did not indicate a specific NSF program. The other Federal agencies specified included 2 for the National Institute of Mental

Health, 2 from the National Institute of Health, 1 from the National Institute of Education, 1 from the Department of Health, Education, and Welfare, and 1 from the National Science and Engineering Council of Canada.

A total of only 12 departments indicated that they had received funds from private sources. Of these 12 departments, 4 failed to identify the specific funding source, and one department reported an anonomous gift. The remaining departments indicated specific private foundations or trusts, and these private sources are listed in Appendix A.

An additional aspect of the data presented in Table 2 concerns the manner in which the various departments learned about the availability of funds for laboratory improvements. It is obvious from the entries in the table that the vast majority of the departments obtained information about funding from agency program announcements. Given the relatively large number of departments that received funding from Federal sources, this finding is not particularly surprizing. A number of departments indicated that they had learned about the availability of funds through some form of personal communication, though given the current data it is impossible to discriminate whether these were contacts with colleagues or with officers of a governmental agency or private foundation.

The final component of the data collected in the survey concerns the nature of any outside assistance received by the departments in designing the new or improved laboratory space or in the selection of equipment. As is shown in Table 2, the two most common types of assistance were consultation with colleagues outside of the department, and visits to other

laboratories. Relatively few departments reported that they obtained construction plans or drawings from other departments, and only a few more employed an outside design consultant. This practice tended to be somewhat more common among doctoral degree granting departments, perhaps reflecting the fact that these departments reported spending a relatively large proportion of their funds on construction and renovation as opposed to equipment.

It would be unrealistic for me to suggest that the results of this survey indicate a bright future for psychology laboratory funding. Given the reduction in the availability of the kinds of Federal funds mentioned most frequently in the responses to the survey, and the general tightness in college and university budgets predicted for the next decade, it seems quite reasonable to predict that funding for laboratory improvements will be more difficult to obtain in the years ahead as compared to the past decade. However, I believe that the data reported here also suggest that psychology departments have not made use of private funding sources to the extent that is possible, and it is in this area that we have the most hope of improving the funding outlook over the next decade. I would suggest that the place to begin is your campus library with two volumes published by The Foundation Center: The Foundation Directory, and The Foundation Grants Index. These volumes provide, respectively, descriptions of foundations and trusts including any regional restrictions and the disciplines emphasized in their awards, and a summary of the actual grants made by the foundations during the previous year. Careful scrutiny of these two publications should provide you with a number of

potential funding agencies--from this point the focus of your search will turn to the writing of an effective proposal.

I encourage all of you to devote some time to investigating the above mentioned volumes, and wish you the best in your funding search.

Table 1

Laboratory Improvement Funding, Expenditure Breakdown, and Laboratory Use, by Degree Program

	BA/BS	MA/MS	Ph.D.	All Programs
Total Funds	$56,716 [43] ($14,500)	$112,377 [22] ($40,000)	$446,272 [24] ($100,000)	$175,532 [89] ($30,000)
Percent for:				
Construction	28.1 [43] (9.0)	43.0 [23] (40.0)	51.0 [26] (57.5)	38.3 [92] (30.0)
Equipment	69.4 [43] (82.5)	55.0 [23] (60.0)	49.0 [26] (42.5)	60.0 [92] (70.0)
Other	2.4 [43] (0.0)	1.9 [23] (0.0)	0.0 [26] (0.0)	1.7 [92] (0.0)
Percent of Time Lab used for:				
Teaching	67.3 [46] (65.0)	56.9 [24] (50.0)	36.1 [26] (32.5)	56.3 [96] (50.0)
Research	32.6 [46] (35.0)	39.3 [24] (33.0)	63.4 [26] (65.0)	42.6 [96] (50.0)
Other	0.0 [46] (0.0)	3.7 [24] (0.0)	0.4 [26] (0.0)	1.1 [96] (0.0)

Note. The entries in the table correspond to the mean, (median), and [N].

Table 2

Frequency Data for Source of Funds, Information Source, and Type of Outside Assistance, by Degree Program

	BA/BS	MA/MS	Ph.D.	All Programs
Source of Funds:				
Institution	34	16	18	68
Federal	16	8	13	37
State	5	3	8	16
Private	7	1	4	12
Other	2	0	0	2
Information Source:				
Program Announcement	13	7	11	31
Annual Report	3	1	0	4
Personal Communication	5	2	3	10
Other	2	0	2	4
Type of Outside Assistance:				
Visits to other labs	16	8	8	32
Plans from other labs	2	3	2	7
Colleagues	16	10	12	38
Prof ssional Consultant	2	4	5	11
Other	1	2	1	4

Appendix A

Private Foundations or Corporations Cited as Funding Sources for Psychology Laboratory Improvements

Dayton Hudson Foundation
777 Nicollet Mall
Minneapolis, MN 55402

Digital Equipment Corporation
Maynard, MA 01754

Ducks Unlimited
1190 Waverly Street
Winnipeg, Manitoba, Canada R3T 2E2

The Harris Foundation
120 South LaSalle Street, Suite 1320
Chicago, IL 60603

The Hogg Foundation for Mental Health
P. O. Box 7998, University Station
Austin, TX 78712

Kresge Foundation
2401 West Big Beaver Road
Troy, MI 48084

Murdock Charitable Trust
915 Broadway
Vancouver, WA 98660

Percival Stern Foundation